

3.2 **BODY WORKING TOOLS**

Body working tools include some very familiar general purpose metal working tools as well as specialized tools only used in auto body repair. The following is a description of the most commonly used body working tools. Because of the wide variety of hammers, files and dollies, some of the less common varieties are not discussed but the tool collection of advanced auto body repair technicians will include all the tools necessary for performing every metal shaping technique, no matter how unusual. A typical set of body working tools is shown in

HAMMERS

A number of different hammers are useful in the body shop. Many are specially shaped for a specific metal shaping operation.

Ball Peen Hammers



The ball peen hammer is a useful multipurpose tool for all kinds of work with sheet metal heavier than the body hammer, it is used for straightening bent underpinnings, smoothing heavy gauge parts, and roughly shaping body parts before work with a body hammer

and dolly begins. A good ball pen hammer, which weighs between 10 and 16 ounces (depending on how much can be swung comfortably), will see a lot of action in a body shop.

Mallets



The rubber mallet gently bumps sheet metal without damaging the painted finish. Its most frequent use is with the suction cup on soft "cave-in" type dents. While pulling upward on the cup, the mallet is used to top lightly all around the surrounding high spots. A popping sound occurs as the high spots drop and the low spot springs back to its original contour.



A steel hammer with rubber tips is another mallet useful in bodywork. The hammer shown in Figure 3-53B has both hard and soft replaceable rubber heads. The soft-faced hammer, as it is sometimes called, is used to work chrome trim and other delicate parts without marring the finish.

Sledgehammer



A light sledgehammer is an essential tool for the first stages of re-forming damaged sheet metal. It should weigh 3 to 5 pounds and have a short handle so that it can be used in tight places. The sledgehammer can be used to knock damaged metal roughly back in to shape and to clear away damaged metal when replacing a panel.

Body Hammers

Body hammers are the basic tools for pounding sheet metal back in to shape. They come in many different designs. Some have flat, square heads; some have rounded heads; and some, called picking hammers, have pointed heads. Every style is designed for a special use for which it is ideal.

Picking Hammers



The picking hammer will take care of many small dents. The pointed end is used to hammer out small dents from the inside; a gentle tap in the centre usually does it. The flat end is for hammer- and-dolly work to remove high spots and ripples. Picking hammers come in a variety of shapes and sizes. Some have long picks for reaching behind body panels. Some have sharp "pencil" points; other have blunted bullet points.

Be careful when using the pick hammer if swung forcefully, the pointed end can pierce the lighter sheet metals used in late model cars. Use the pick only on small dents.

Bumping Hammers



Larger dents require the use of a bumping hammer. Bumping hammers can have round face or a square face. The surface of the faces are nearly flat. The faces are large area. These hammers are used for initial straightening on dented panels or for working inner panels and reinforced sections that require more force but

not a finish appearance.

Sharp concave surface. Such as the reverse curves on quarter panels, headlights, doors, and so on require the use of a reverse curve light bumping hammer. The faces of this hammer are crowned one in the opposite direction of the other. The tight curve of the faces allows concave stretching the metal. Remember, the contour of the hammer must be smaller than the contour of the panel to avoid stretching the metal.

Finishing Hammers

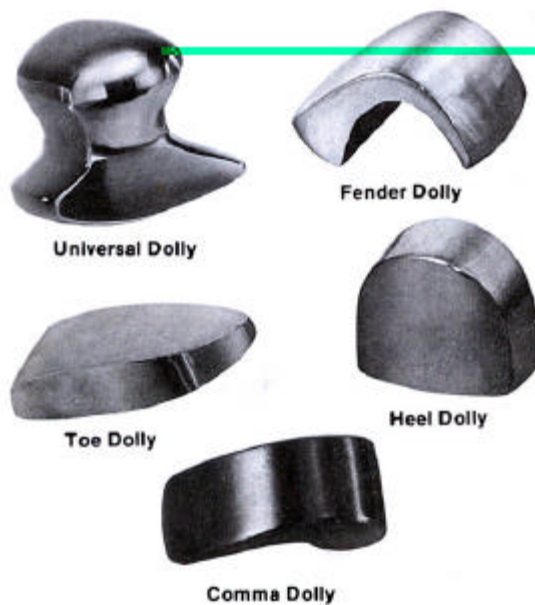


After the bumping hammer is used to remove the dent, final contour is achieved with the finishing

hammer. The faces on a finishing hammer are smaller than those of the heavier bumping hammer. The surface of the face is crowned to concentrate the force on top of the ridge or high spot. A shrinking hammer is a finishing hammer with a serrated or cross-grooved face. This hammer is used to shrink spots that have been stretched by excessive hammering.

(A) Double round (B)&(E) Shrinking hammer
(C) Off-set bumping (D) Dinging hammer

DOLLIES



The dolly or dolly block is used like an anvil. It is generally held on the backside of a panel being struck with a hammer. Together the hammer and dolly work high spots down and low spots up.

There are many different shapes of dollies each shape is intended for specific types of dents and body panel contours-high crowns low crowns, flanges, and others. It is very important that the dolly fits the contour of the panel. If a flat dolly or one with a low crown is used on a high crown panel, additional dents will be the result.

A general-purpose dolly has many contours. It can be used most situations. A rail type dolly is another commonly used dolly with many contours toe and heel dollies are used for bumping in tight places, and the flat right angle edge is used for straightening flanges.

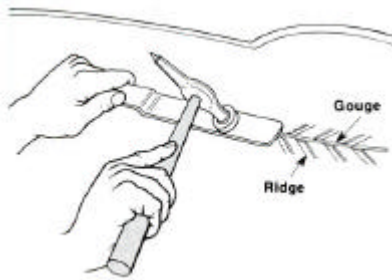
Spoon

Body spoons are another class of bodyworking tools that are used sometimes like a hammer and sometimes like a dolly. Available in a variety of shapes and sizes to match various panel shapes, the flat surface of a spoon distributes the striking over a wide area. They are particularly useful on creases and ridges. A spoon dolly can be used as a dolly where the space behind a panel is limited. A dinging spoon is used with a hammer to work down ridges. Inside spoons can be used to pry up low places or can be struck with a hammer to drive up dents. Bumping files have serrated surfaces and are used to slap ridges or the underside of creases to bump the metal back to its original shape.



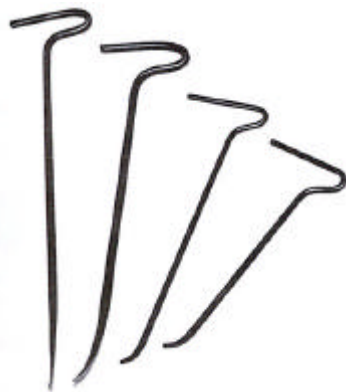
A)spoon dolly B)light dinging spoon C)surfacing spoon D)Inside high crown E)Inside medium crown F)inside heavy-duty spoon G)bumping file

Lowering a ridge with a hammer and spoon



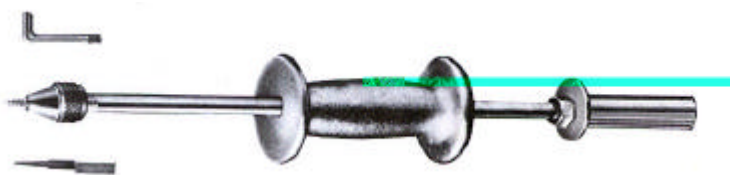
Serrated surface and are used to slap ridges or the underside of creases to hump the metal to its original shape.

PICKS



Picks like spoons, are used to reach in to confined spaces. The pick is used only to pry up low spots. They vary in length and shape and most have a U-shaped end that serves as a handle. Picks are commonly used to rise low spots in door, quarter panels, and other sealed body sections. Picks are often preferred to slide hammers and pull rods because they do not require drilling holes in the sheet metal.

DENT PULLERS AND PULL RODS



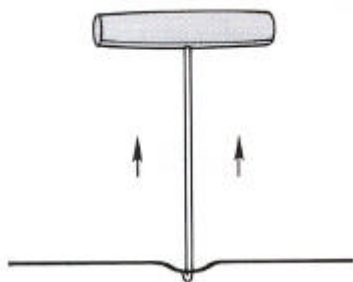
puller or pull rod. Either tool requires one or more holes drilled or punched in the crease.

Creases in sealed body panels or panel sections that can not be reached from backside even with the longest spoon can be pulled out with a dent

A dent puller usually comes with a threaded tip and hook tip. Either tip is inserted in the drilled hole and a hammer is slid on a steel shaft and struck against the handle. Tapping the slide hammer against the handle slowly pulls up the low spot.

Working with a dent puller is faster when a metal piercing tip is used. When the metal tip is forced through the sheet metal, the angular rings grip the metal as the hammer is tapped against the metal. When the metal has been pulled back to shape, the tip can be backed out of the hole by turning it counter clockwise.

Pulling a small dent with a pull rod



A pull rod is used in this manner. The curved end of the pull rod is inserted in the drilled hole. A small dent or crease can be pulled up with a single pull rod. Three or four pull rods can be used simultaneously to pull up larger dents. A body hammer can also be used with a pull rod. The high crown of a dent can also be used with a pull rod. The low spot is pulled up simultaneously bumping and pulling returns the panel to its original shape with less danger of stretching the metal.

It is important to close the holes created by using dent pullers and pull rods by soldering or welding. Simply patching the holes with body filler will not provide sufficient corrosion protection.

SUCTION CUPS



The suction cup is a simple tool that makes short work of shallow dents if they are not locked in by a crease in the metal. Simply attach the suction cup to the centre of the dent and pull. The dent might come right out with no damage to the paint and no refinishing required. It is an easy tool to use and can make a simple repair. However, once a dent is

locked in, some hammer and dolly work will be necessary to smooth the metal. Even so, the suction cup method is usually worth a try.

PUNCHES AND CHISELS



A good set punches and chisels is absolutely in every body working tool chest. Centre punches are used to mark the location of parts before they are removed and for marking a spot drilling. (The punch mark keeps the drill bit from wandering.) A drifter or starter punch has a tapered point with a flat end that is used to drive out rivets, pins and bolts. A pin punch is similar to the drifter except its shaft is not tapered; thus it can be used to drive out smaller rivets or bolts. An aligning punch is a long tapered punch used to align body panels for welding or other body parts (such as fender bolt holes and a bumper).

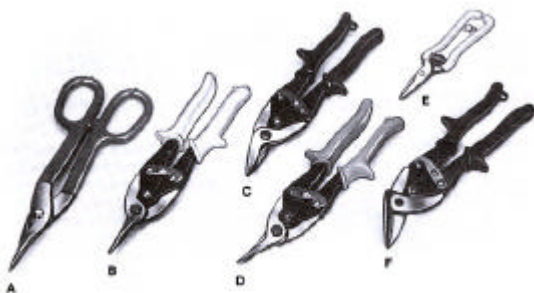
A chisel is a steel bar with a hardened cutting edge for hearing steel. These chisels come in various sizes and a set is necessary for both light and heavy-duty work. The cold chisel is used to split frozen nuts, shear off rusted bolts, cut welds, and separate body and frame parts.

SCRATCH AWL



A scratch awl. is very similar in appearance to an ice pick, pit the pointed steel shank is heavier. A scratch awl is used to pierce holes in their metal when a specific size hole is not required. It is also used to mark metal for cutting drilling or fastening. A hammer can be used to lightly drive the awl through heavier metal. Keep the awl ground to a sharp point so it can be used effectively and safely in every job.

METAL CUTTING SHEARS



Most body repair technicians have at least one pair of shares or tin snips. Snips are used to trim panels or metal pieces to size. Several types of metal cutters are useful.

A. Tin snips, B. Straight cut, C. Right cut shear, D. Left cut shear, E. Light duty snips, F. Aviation snips

Tin Snips

Tin snips are perhaps on most common metal cutting tool. They can be used to cut straight or curved shapes in heavy steel.

Metal Cutters

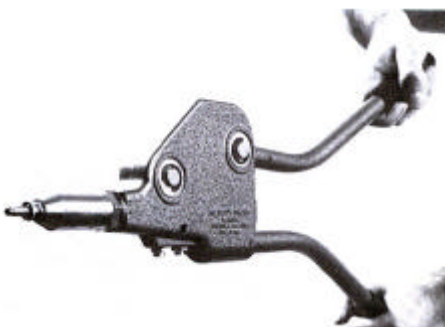
Metal cutters also called aviation snips, are used to cut through hard metals such as stainless steel. The narrow profile of jaws allows the snip to slip between the cut metal. The jaws are serrated to cut through the tough metal.

Panel Cutters



Panel cutters are special snips used to cut through body sheet metal. These are used to make straight or curved cut outs in panels that require spot repair for rust or damage. They are designed to leave a clean, straight edge that can be easily welded.

RIVET GUN



Pop rivets are one of the handiest inventions for auto body work. They can be inserted in to a blind hole through two pieces of metal and then

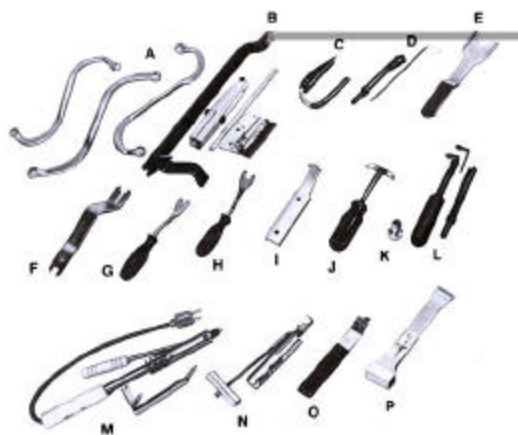
drawn up with a riveting tool, locking the pieces of metal together. There is no need to have access to the back of the rivets, and if enough rivets are used, the joint created is extremely strong. For any kind of sheet metal replacement such as rust hole repair, the pop rivet is by far the easiest and least expensive joining system available. In fact, most body shops use rivets extensively, either as a permanent repair or as temporary fasteners. They are used as temporary fasteners before the replacement sheet metal is welded in places where extreme heat would distort the metal or create a safety hazard (such as around the gas tank). A good rivet gun does not cost much. The most commonly used rivets in bodywork are 1/8- and 3/16 inch. A few others of assorted sizes might be needed for special jobs.

A heavy-duty riveter, such as the one shown in is used to rivet hard-to-reach places and heavier mechanical assemblies such as a window glass regulator. It has long handles, a long nose, and sets 3/16 to 1/4 inch blind rivets.

UPHOLSTERY TOOLS

Any repair work that requires removing interior trim will be facilitated with an upholstery tool. This prong-shaped prying tool is used to slip under and pry up upholstery tacks, springs, clips and other fasteners.

DOOR HANDLE TOOL



Interior door handles are often secured to the door panel by wire spring clips. Shaped like horseshoes, fit over the handle shaft and hold handle tightly against the interior panel trim. Clip pullers or door handle tools are needed to reach inside the door and remove the clip. Some door handle tools pull the clip out; Others push the clip off the shaft.

A) door hinge bolt wrenches B)door removal kit C & D)door panel remover E & F)door handle tool G & H)Trim pad remover I>window molding release tool J>window locking strip installation tool K>window sash nut spanner socket L>window remover M)hot-tip windshield remover kit N>window wiper removal tool O>window wiper tool P)all-purpose window scraper

Sheet Metal Brakes



Many body repairs require metal patches to be riveted or welded in to place. A tool that comes in handy for bending sheet metal is shown in Figure. This sheet metal brake bends sheet metal up to 20-gauge and sheet aluminium up to 16 gauge. Clean, smooth bends up to 90 degrees can be made with a brake. The brake is also used for cutting sheet metal

to size. This is done by first bending the metal 90 degrees. Then the metal is worked back and forth by hand until the metal breaks along the crease.

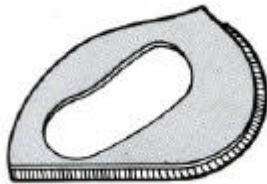
3.3 Body Surfacing Tools

A number of surfacing tools are used to give a repair its final and contour. Some are used to shape the repaired metal. Others are used to apply and shape plastic body filler and putty.

Metal Files

After working a damaged panel back to its approximate original contour, a metal file is used to remove any remaining high spots. Two special files are necessary for most bodywork.

Reveal File



The reveal file is a small file that is available in numerous shapes. Generally it is curved to fit tightly crowned areas such as around wind shields, wheel openings, and other panel edges. The reveal file is pulled, not pushed, when used. Pushing causes the file to chatter, resulting in nicks and an uneven surface.

Body Files

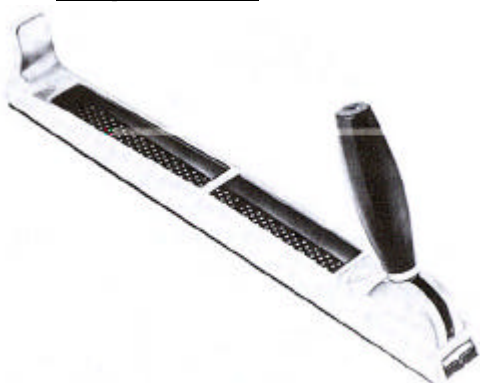


Body files are used to level large surfaces. After a dent has been bumped or pulled back in to shape, the body file will hone down high spots and reveal any low spots that might require additional bumping. Keep in mind that it is possible to file through thin metal used in some vehicles.

The blade of the body file is held in a flexible holder with a turn buckle. The turnbuckle can be adjusted to flex the file. The flexible holder allows the shape of the file to fit the contour of the panel.

Fixed file holders are also available for filling flat or slightly convex shapes.

Surform File



Body filler can be made level to the adjacent panel with a surform file. Commonly referred to as a "cheese grater," the surform file is used to shape body filler while it is semi hard. Shaping the filler before it hardens shortens the

waiting period while the filler cures and reduces the sanding effort later in the repair process.

Speed File

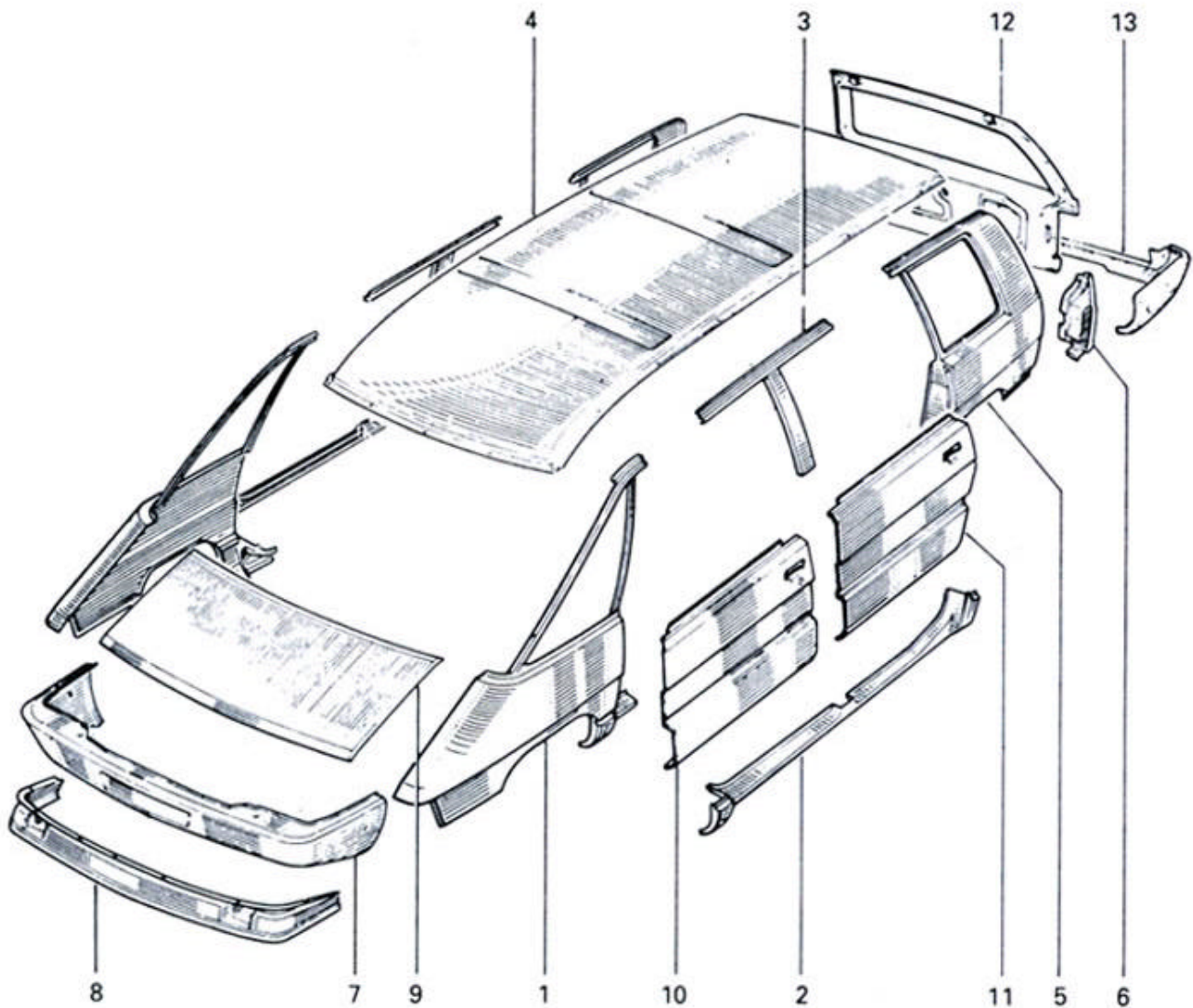
Once the body filler has hardened, the repair can be shaped and levelled with a speed file. A speed file is a rigid wooden holder about 17 inches long and 2-3/4 inches wide. Also called a flat boy, the speed file allows a repair area to be sanded quickly with long, level strokes. This eliminates waves and uneven areas.

The lightweight aluminium sander shown in Fig 3-88A is designed to quickly level body filler. The extra long length helps avoid creating a waxy surface. The sander also flexes to match the panel contour. Adhesive backed sandpaper is applied from a roll. This particular sander can also be attached to a straight-line air sander.

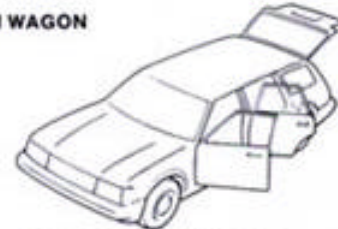
Spreaders and Squeegees

Spreaders and squeegees are two important tools used in auto body resurfacing. Spreaders are used to apply body filler. Spreaders are made of rigid plastic and are available in various sizes. Be sure to use one that is large enough to apply plastic filler over the repair area before the filler begins to set up.

A squeegee is a flexible rubber block approximately 2 inches by 3 inches and 3/16 inch thick. Squeegees are used to apply glazing putty and light coats of body filler. They are also used when wet sanding to skim water and sanding grit from the repair area.

DIFFERENT BODY PARTS

- 1) Fender
- 2) Rocker panel
- 3) Roof side rail with centre body pillar
- 4) Roof panel
- 5) Quarter panel
- 6) Tail lamp holder
- 7) Front bumper sheet
- 8) Deflector
- 9) Hood panel
- 10) Door assembly
- 11) Door assembly
- 12) Back door panel

DIFFERENT BODY SHAPES**2-DOOR SEDAN****4-DOOR SEDAN****Typical sedan body shapes****3-DOOR LIFTBACK****5-DOOR LIFTBACK****Typical liftback body shapes****2-DOOR HARDTOP****4-DOOR HARDTOP****Typical hardtop body shapes****2-DOOR STATION WAGON****4-DOOR STATION WAGON****Typical station wagon body shapes****2-DOOR CONVERTIBLE****4-DOOR CONVERTIBLE****Typical convertible body shapes****2-DOOR TRUCK****4-DOOR MINIVAN****Typical sports vehicle body shapes**